

Claims

What is claimed is:

1. A method for determining distribution data for a disposal domain parameter in a cuttings injection process, comprising:
 - performing a fracturing simulation using a site specific datum to obtain a fracturing result;
 - determining a probability of creating a new fracture using the fracturing result and a probability model;
 - performing a plurality of fracturing simulations using the probability and a distribution associated with the probability to obtain disposal domain information; and
 - extracting the distribution data for the disposal domain parameter from the disposal domain information.
2. The method of claim 1, further comprising:
 - performing a risk assessment analysis for the site using the distribution data for the disposal domain parameter to obtain a risk assessment.
3. The method of claim 2, further comprising:
 - determining whether the disposal domain parameter satisfies a criterion using the risk assessment.
4. The method of claim 3, wherein the criterion is at least one selected from the group consisting of a governmental regulation and a cost criteria.
5. The method of claim 1, further comprising:
 - performing a risk assessment analysis to determine a value of a particular site specific datum with respect to increasing operational assurance.

6. The method of claim 1, further comprising:
determining an operational parameter using the disposal domain information.
7. The method of claim 1, further comprising:
generating an operational parameter using the data distribution for the disposal domain parameter.
8. The method of claim 1, further comprising:
extracting sensitivity study information associated with the disposal domain parameter from the disposal domain information.
9. The method of claim 1, wherein the disposal domain parameter comprises at least one selected from the group consisting of disposal zone selection, fracturing length, number of disposal wells, injection pressure increase, and disposal well capacity.
10. The method of claim 1, wherein the probability model comprises a probability-based decision tree comprising at least one probability value.
11. The method of claim 10, wherein using the probability-based decision tree comprises:
using the fracturing result and a formation property to:
determine the probability of creating the new fracture if the fracture is not closed;
determine the probability of creating the new fracture if the fracture is closed and no screen-out occurs prior to closure; and
determine the probability of creating the new fracture if the fracture is closed and screen-out occurs prior to closure.
12. The method of claim 10, wherein the at least one probability value is associated with an injection zone.
13. The method of claim 10, wherein the probability value is obtained from a database of field data.

14. The method of claim 1, wherein extracting the distribution data from the disposal domain information comprises using numerical analysis.
15. The method of claim 14, wherein a result of the numerical analysis is a percentage certainty.
16. The method of claim 1, wherein performing the plurality of fracturing simulations comprises using a Monte Carlo simulation methodology.
17. The method of claim 1, wherein the fracturing simulation and the plurality of fracturing are performed using a deterministic fracturing simulator.
18. A system for determining distribution data for a disposal domain parameter in a cuttings injection process, comprising:
 - a probability component configured to obtain a probability of creating a new fracture using a fracturing result and a probability model;
 - an integration module configured to generate at least one input parameter for a fracturing simulation using the probability and further configured to extract distribution data associated with at least one disposal domain parameter from the disposal domain information; and
 - a fracturing simulation component configured to perform the fracturing simulation to generate the disposal domain information using the at least one input parameter.
19. The system of claim 18, further comprising:
 - a data acquisition component configured to obtain data associated with the at least one input parameter.
20. The system of claim 18, further comprising:
 - a knowledge database component configured to provide the probability model.

21. The system of claim 18, wherein the at least one disposal domain parameter comprises at least one selected from the group consisting of disposal domain selection, fracturing length, number of disposal wells, injection pressure increase, and disposal well capacity.
22. The system of claim 18, wherein the integration component is further configured to quantify the impact of geological uncertainties and CRI operational uncertainties on cuttings re-injection quality assurance using the disposal domain information.
23. The system of claim 18, wherein the probability model comprises a probability-based decision tree comprising the probability value.
24. The system of claim 23, wherein the probability-based decision tree comprises:
 - using the fracturing result and a formation property to:
 - determine the probability of creating the new fracture if the fracture is not closed;
 - determine the probability of creating the new fracture if the fracture is closed and no screen-out occurs prior to closure; and
 - determine the probability of creating the new fracture if the fracture is closed and screen-out occurs prior to closure.
25. The system of claim 18, wherein the probability value is associated with an injection zone.
26. The system of claim 18, wherein the integration component is further configured to extract the distribution data from the disposal domain information using numerical analysis.
27. The system of claim 26, wherein a result of the numerical analysis is a percentage certainty.

28. The system of claim 26, wherein the fracturing simulation component is further configured to use a Monte Carlo simulation methodology to obtain the at least one input parameter.
29. The system of claim 18, wherein the fracturing simulation computer uses a deterministic fracturing simulator.
30. The system of claim 18, wherein the integration component is further configured to perform a risk assessment analysis for the site using the distribution data for the disposal domain parameter to obtain a risk assessment.
31. The system of claim 30, wherein the integration component is further configured to determine whether the disposal domain parameter satisfies a criterion using the risk assessment.
32. The system of claim 31, wherein the criterion is at least one selected from the group consisting of a governmental regulation and a cost criteria.
33. The system of claim 18, wherein the integration component is further configured to generate an operational parameter using the data distribution for the disposal domain parameter.
34. The system of claim 18, wherein the integration component is further configured to extract sensitivity study information associated with the disposal domain parameter from the disposal domain information.